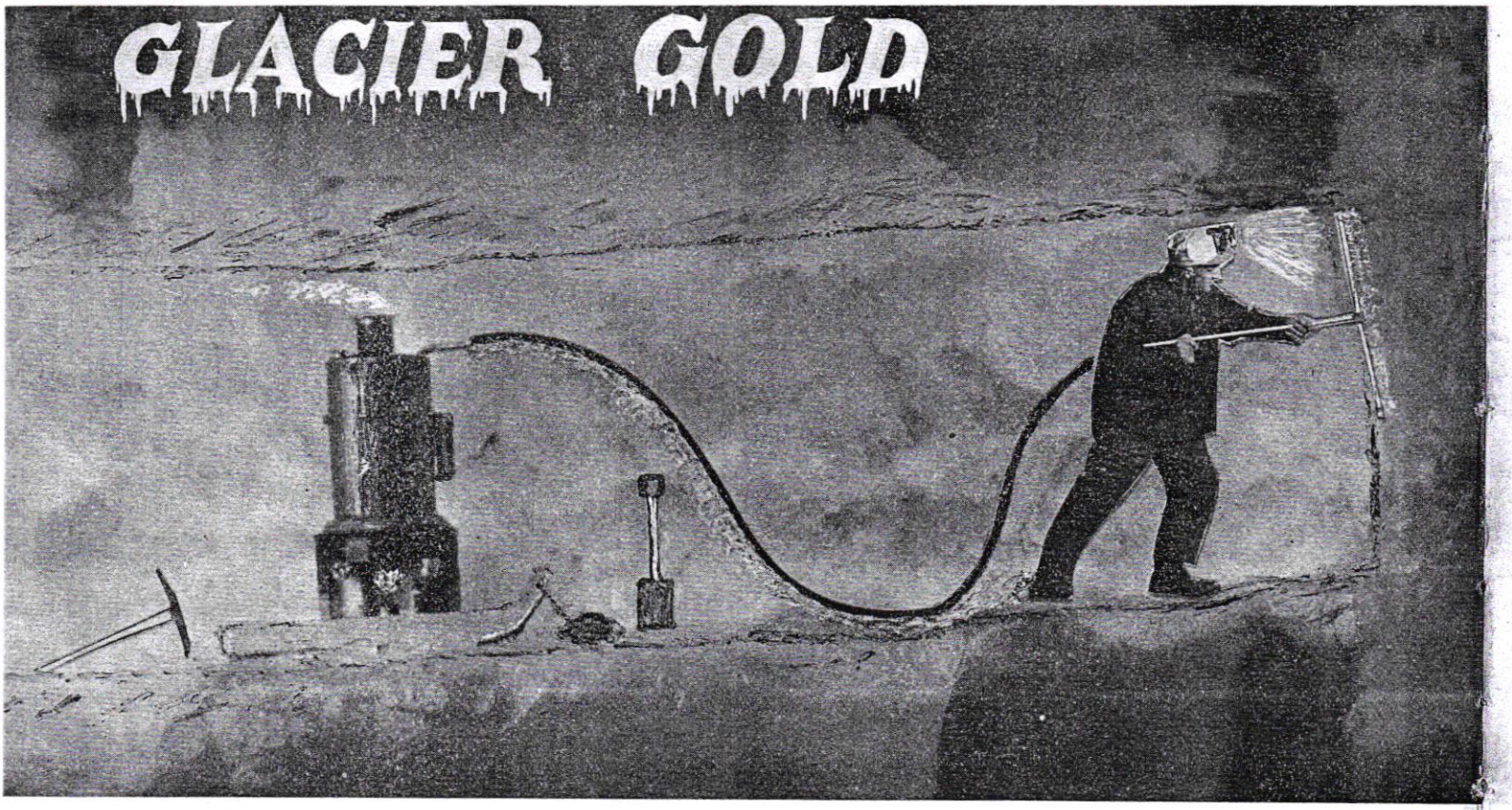
GLACIER GOLD



Often working one hundred fifty feet from the surface, the prospector cut 6,000 feet of tunnel through the glacier in a search for gold. The above composite photograph, designed to give a cross-section view, indicates how a T-shaped steam nozzle was used to cut blocks of ice three feet square. The blocks were conveyed out of the tunnel on a sled.

I'VE BEEN called all kinds of a fool—tunneling into a glacier for gold! So, even if this ore I've just found at an altitude of 5,000 feet under an ice cap, does pan out at fourteen thousand dollars a ton, I guess one might call it "fool's gold."

No doubt, the most interesting part of this story of my exploration of the floor of a glacier at Texas Creek, near Hyder on the American side of the Canadian boundary, would be the difficulties I've gone through in these past twelve years—the physical, financial and mental exhaustion—which have been a part of this work, but I'm not going to dwell on that.

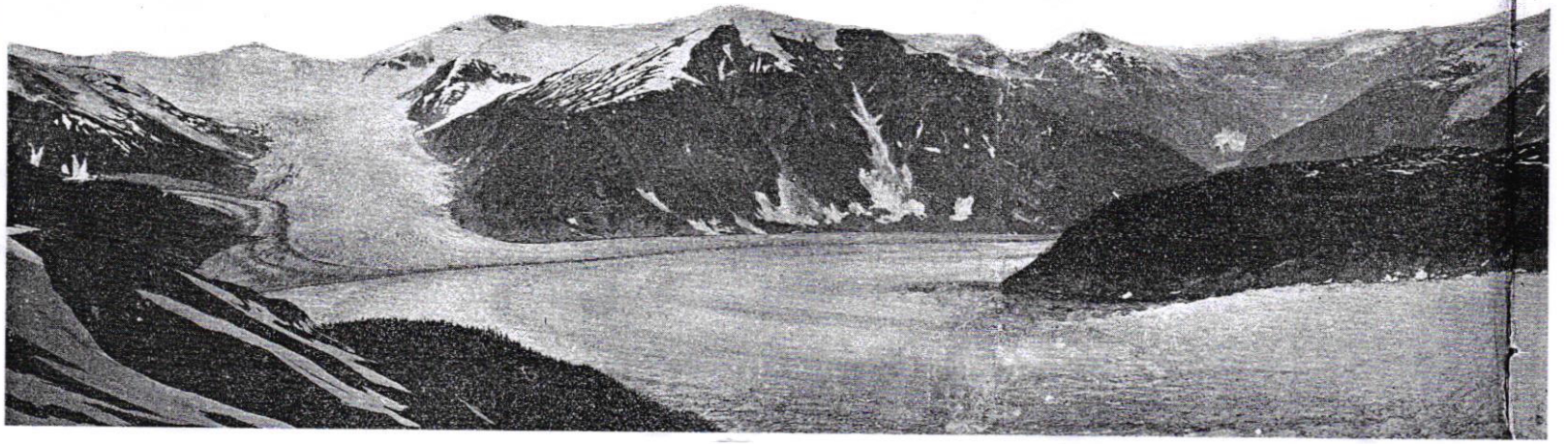
The satisfaction comes in having found what I've gone after, even though, in the end, it may not turn out to be worth all the trouble. What I've been looking for is the source of some unbelievably rich high-grade electrum—an alloy that contains about two ounces of silver to one of gold—and which assays, as I've said, fourteen thousand dollars a ton. That's rich ore, even though it is under a glacier on the top of a mountain in a remote district.

The discovery goes back to 1925 when my partner and I prospected the Chickamin Glacier and found some good looking galena along the edge of an ice cap which feeds the Chickamin and Salmon Glaciers. This galena ore which we found along the lateral moraine, though quite rich, was not of commercial value due to the isolation of the place and difficulties of getting supplies to it. There was about ten thousand dollars worth right in sight, all ready to take out.

Although this galena did run one hundred dollars a ton and we had done a lot of work, and staked the ground, we had decided by the spring of 1928 to give up the proposition. The difficulties of developing the prospect were too great. We prepared to move out.

It was a few days before the date we had set to pack up and abandon everything that I had occasion to cross a portion of the glacier. The crossing would be quite dangerous because there was a crevasse and steep incline ahead, but on any other day but this I might have negotiated them without difficulty. That afternoon, however, I was tired and nervous and, knowing that one has to be

Like giant rivers of ice, glaciers are still scouring the 6,000-foot mountains and valleys of the district near the Canadian boundary at Hyder, Alaska. Below is the giant Chickamin Glacier, of which nearly twenty miles is shown, and some of the glaciers which feed it, such as Thumb Creek Glacier at left. Another branch of the Chickamin enters at the bottom of the picture, which was taken at an altitude of 5,000 feet, from the glacier mine described in this story.



in full control of all of one's faculties for such a climb, I decided to go a little higher along the rock on the edge of the ice cap, around the steep place on the glacier.

When I got part way up to this slightly safer crossing I sat on the ground to rest. More from a force of habit than anything else, I idly began picking up loose rocks, thrown aside by the glacier, and examining them. When breaking up one small boulder I noticed a formation I had not encountered there before—quartz breccia.

There were heavy bands of electrum in the quartz, just as plain as could be. I immediately got a different opinion of the ground and became enthusiastic. I had been sitting right in the middle of the piece of ground we had staked.

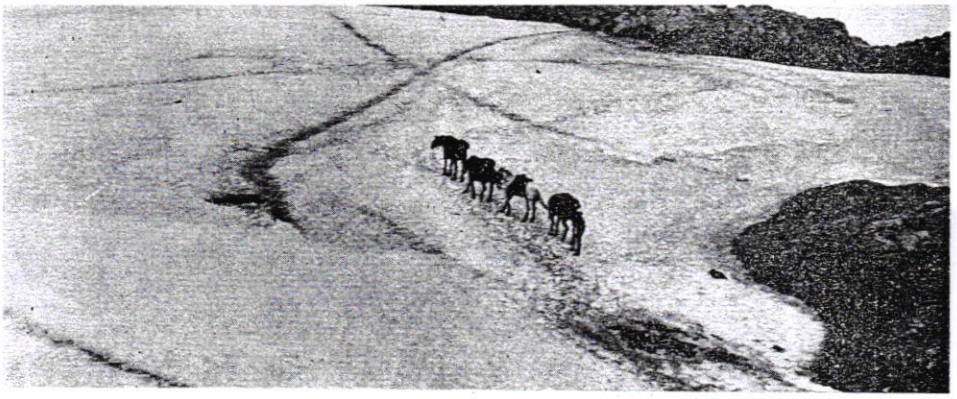
I had found the rock within two feet of the edge of the ice cap, about 780 feet from the top of the dome. It looked good to me, but after all, it was only a piece of "float" and the question was, where did it come from? Where was the parent vein?

THE float assayed $14,000 a ton. We learned this soon after we returned to town, a few days later. But we didn't have any funds to continue the search and my partner was for selling out.

I found a buyer for his interest. He was a wealthy California man who was reputed to have been worth thirteen millions. Soon after he bought my partner's share the depression came and wiped him out completely. He became a mental as well as physical and financial wreck and died of a broken heart. I didn't get any financial aid from him.

It was almost impossible to get anyone else interested in a "fool" proposition of tunneling under a glacier to find a vein which might be there and then again might not. People began to laugh—asked me if I intended to melt off the ice cap! Mining men told me that the float might have come from many miles away, in spite of the fact that it was right there on the top of a mountain and rocks don't "float" up. I showed one old prospector a piece of float which I later had assayed and which ran ten thousand dollars a ton and he told me that there wasn't any gold in that rock and I might as well throw it away.

I guess the only person who had faith was my brother. I got him interested and together we began tunneling in 1930. We'd start work in the summer and work till Christmas.



Horses were used to transport supplies to the prospect. Above is a pack train of four sure-footed horses with each horse transporting thirty gallons of fuel oil, shown as they crossed a dead "feeder" of the Chickamin Glacier last year.

Many stories of hardships and perseverance in the search for gold could be written, although those who have experienced such struggles are loath to write about them.

"Glacier Gold" is a fact story. Many mining men will recognize the prospector who has written it. In order to induce him to tell the story, however, it was necessary for The Alaska Sportsman to agree to the stipulation that his name be not used in connection with it. Hence, is is presented without a "by" line. It is an absorbing tale of hardship, perseverance and final success.

After that there was no way of getting in supplies.

It was a heart-breaking task to get supplies up in the summer as it was. We had to haul up all material for a house and build one that would withstand gales of 120 miles an hour, but we did it by constructing it in the lee of a ledge and anchoring it down with cement and cables. We built a trail for horses and carried up the lumber and equipment which included coal, provisions, a small boiler, tools, hose, pipe, and other material. It cost forty dollars a ton to transport the stuff up there.

WHILE on the mountain we were away from all comforts and we encountered the severest kind of weather. The snow would often completely bury our cabin and at other times winds would come and blow away nearly every vestige of snow, creating great snowstorms when no snow was falling.

We located a vein of the same characteristics as that of the electrum float we found, in the rock, near the glacier. It extended for eight hundred feet beyond the ice cap, but it was low-grade compared with the float. I decided that the high-grade ore had come from that same vein deep under the glacier, but experienced mining men told me they thought this highly improbable.

We tunneled into the ice so as to follow this vein as closely as possible. Now, it would be easy to follow a vein anywhere if veins ran along vertically in the rock, but this characteristic vein was at an angle of about forty-five degrees—and with the ground dipping and rising, a per-

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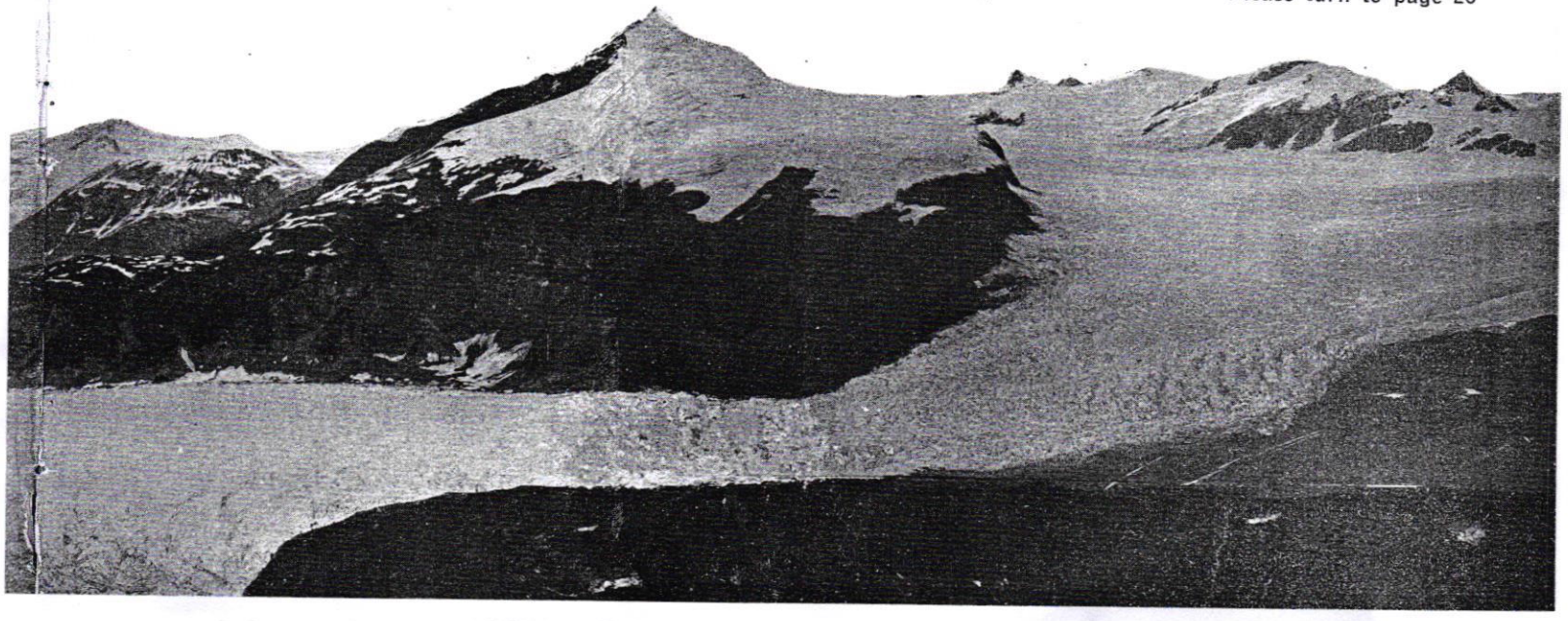

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son might be on the vein for fifty feet, then, even if he were cutting straight, be a hundred or two hundred feet off when the ground dipped. And we had to work blindly, under the ice.

The way we tunneled was on a more or less novel principle—one that of course cannot be used on any other material other than ice. We cut the tunnel out with steam!

A gasoline-burning boiler was set up on a sled. The boiler was only about five feet high, so we could drag it under the ice after us. By carrying the outlet pipes through the stack we super-heated the steam. Our cutter was made of three-eighth-inch pipes in three-foot lengths, T-shaped, with a long line of small holes through the top of the T for the escape of the steam.

The top of the T was about three feet long. When we held it against the ice the steam melted a three-foot crack in the ice and we thus cut out six blocks in the face of the tunnel, each three feet square. To cut out the back of the block we turned the pipe so that the steam would play down.

WE WERE told that the proper way would be to sink from the surface of the ice down to the rock. But though the distance would have been shortened—consider the task of lifting the blocks of ice up from the hole! The way we worked it, all we had to do was to push the block on to a little sled. Gravity carried the sled out to the mouth of the tunnel. Then, when a rope stopped the sled with a jerk, the cake of ice would bounce off and go tumbling down the mountainside.

We were able to make considerably better progress in the ice than we would have in rock and at less expense. The two of us could make about twelve feet a day. We would laboriously examine the floor at every step so as not to overlook the high-grade vein and, in fact, we found, eventually, that we had been right on it three times without recognizing it.

Our greatest difficulties in cutting came when we encountered rock particles in the ice or hardened material on the floor. The crushed rock and stones sometimes were cemented over the rock by the action of the glacier and its terrific pressure. We had to get this hard surface off the floor in order not to overlook the vein. We'd pick it out and often had to sharpen the picks as much as two or three times a day. At other times a rock in the solid ice would prevent us from melting out a block in the face of the tunnel.

We were encouraged, though, in finding more and more rich float as we went along, so we felt sure we were on the right track.

At the mouth of the tunnel, for some distance, the light would filter through the ice and into the hole, and the ice would take on beautiful shades of blue and green. Later on y the ultra-violet rays found their way through and eventually we worked in the dark, only carbide lamps supplying us with light.

The floor of the glacier dipped and rose and occasionally we'd encounter pools of water. During warmer periods we'd hear torrents of water which came from surface melting, rushing under the ice. The temperature of the tunnel remained at just a degree above the freezing point the year around, so it was not as cold as one might think. Scientists explain this as due to pressure of the ice and friction created as it creeps over the rock.

The ice cap was moving all the time, of course, but the movement was not visible to us. It moved faster the nearer the center we got, the movement being most evident when we cross-cut to get on the vein again. I should say the average movement was half an inch a day.

An interesting sidelight on the movement of the ice was the fact that a duckboard which we used to cross a crevasse and which fell into it in July, 1930, was recovered when it emerged, intact, at the face of the ice, 110 feet distant, in July, 1936. At another time the glacier gave up the body of a mountain goat, with hide and horns intact, very little worse for the years it must have been in "cold storage."

At places we'd come to little open places under the ice, especially where the ice flow was from over the top of a bluff. Here there would be a room, much like you would find under the curtain of a water-fall. These chambers were the most likely places for float and some times we'd find them filled with loose material kicked back as the ice rolled over after hitting solid rock again after flowing over the bluffs.

OCCASIONALLY the bottom of the glacier would be lifted clear off the floor so one could crawl under the ice for a hundred feet or more. Such places made it easy when we wanted to seek the lost vein. Occasionally these cavities would be just large enough for us to crawl under or maybe we'd have to enlarge the place by picking ice away so as to make room.

When we had occasion to crawl into one of these open places under the glacier we'd have an ominous feeling of danger, especially if we had to pick away enough ice to make room to lie down. We'd think of all those thousands of tons of ice above us. The knowledge that, if the ice cap should settle ever so little, we would be pinned under it and crushed, often made us quiver.

We never quite got over the frights we experienced when, by picking at the tunnel face with our pick, we'd relieve that terrific pressure ever so little and the ice would crack with a singing sound much like the song of a bird. It would send chills down our spine for fear that the glacier above

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to twelve feet deep; though on some of the upper creeks, with bedrock but two or three feet deep, the placers were worked by open cuts.

Eastward, the Salmon River rises in the west flanks of the Aklun Mountains, flowing south into Chagvun Bay, some twenty miles east of Goodnews Bay. The gravels of this stream carry gold and platinum, most values being in platinum, with the gold content very low. The average overburden on Salmon River is similar to that of the the Arolic-Goodnews area.

EARLY work on all these streams resulted chiefly in gold production, with very little platinum output until recent years, although most of the gold gravels carry platinum and some osmiridium. The latter is a combination of osmium and iridium, worth about $110 an ounce. The gold, platinum and osmiridium cannot be separated by field methods, as their specific gravity is almost the same. Eight years ago only a few miners were in this region. They made about ten dollars a day working by hand.

In 1931, with platinum but twenty-four dollars an ounce, the output reached 616 ounces, a fair percentage of it being gold and some osmiridium, though figures on the latter metal are not available. For 1934, the platinum output of this district was 605 ounces. Next year, helped by dredges and a rise in price, production rose to over two thousand ounces. Last year the January platinum quotation was thirty-eight dollars and by September had climbed to $68.90, but fell to $54 next month—which was still the price in May, this year, and on this price the Goodnews platinum output was four times larger than that of 1935. The total 1936 Alaska production was 8,685 ounces, worth $312,000, most of it from the Goodnews district. The rest came chiefly from Dime Creek, on Seward Peninsula.

Right here this department wishes to point out that public attention has thus far been directed chiefly to the Goodnews platinum strike of Brevik, Haraldson and Wiklund in October, last fall, with little heed being given to another equally important strike of placer gold. On January 12 of this year, a placer strike of coarse gold was reported to the head of Togiak Lake, in this same general district. It was made by Lap reindeer herders.

It should be noted that this took place when the lake was frozen and the ground covered deeply with snow. Togiak Lake, which is some fifteen miles long and a mile or two wide in places, lies north and east of the Arolic-Goodnews-Salmon district, just across the Aklun Mountains. This lake is the source of Togiak River, which flows some hundred miles south into Togiak Bay, which is about seventy-five miles east of Chagvun Bay, around Cape Newenham. All this Togiak region is uninhabited, except for some Indian settlements along the lower river and at its mouth.

Note also that in 1914 the U. S. Geological Survey reported that one man rocked pay-gravel on the beach, near the mouth of Togiak River, yet no attention was paid to the report, neither then, nor since. Now, with pay-gold discovered at both ends of this stream, a most promising and entirely virgin country is opened to prospectors. This is in addition to the fifty-odd miles of new platinum ground on the Goodnews River, proved by the discovery that the serpentine formation extends to its mouth. Nor is it at all impossible that this serpentine formation extends also to Togiak River, and that platinum and osmiridium may exist in its gold placers.

Access to this region has been by sledging on late spring snow from Bethel, on the lower Kuskokwim, a distance of some 125 miles, or a little greater distance by small boats along the coast. Coastwise steamers from Anchorage or Seward do not care to enter these bays, which are very shoal with many sandbanks. Moreover, the fare from Seattle to Bethel on the W. M. Tupper, which sailed on May twentieth, is one hundred dollars. The freight rate is thirty dollars a ton. Most stampeders are going by plane from Anchorage, paying seventy-five dollars for a flight of but four to five hours.

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us would give way. Whenever the ice would sing like that we'd say we "had hit a birdie."

Often, when we'd pick away at the tunnel, we'd open up cavities in which water was compressed and we'd get a shower. The water, being under pressure, would sometimes squirt out with considerable force. An interesting commentary on human nature was the fact that if the other fellow got the shower we'd laugh, and he'd get angry, whereas if we'd get the bath, he'd laugh and we'd not see the humor of the situation.

IN MANY aspects the motion of the glacier resembles that of a river, and there appeared to be swirls and eddies and upward creeps on shelving curves, much like that of stream action. Also, it moved faster at the center than the sides and at the surface faster than at the bottom. In the tunnel, however, the movement was most evident the deeper we got, because the pressure of the ice had a tendency to close up the opening we'd made.

We found out how the glacier carves out the valleys and planes down the floor underneath it, for we found rocks imbedded in the glacier. These, held fast under terrific pressure, acted as graving tools when they came in contact with the mountain and were carried along by the flow of the glacier. The ice itself would not wear the rock.

We'd live in the little house on the side of the mountain, bringing in our supplies each summer by pack train. We'd work from early morning till

late at night and often not see any daylight at all. If the day was nice we'd come out at noon for our lunch, but usually we'd heat up our food on a little gas stove inside the tunnel, sometimes a hundred-fifty feet from the surface.

Often we'd have to drive three hundred feet before we'd hit the solid rock under the glacier and occasionally have to cross-cut as much as two hundred fifty feet in each direction to hit the vein. Again and again after we'd driven one tunnel we'd have to abandon it and start another one higher up on the ice cap. The tunnels, of course, close up each year. Sometimes the mouth of a tunnel would remain open for a year or more, because at the surface there was not as much stress.

Well, we worked in this manner for four seasons, until the spring of 1933. Then, after contending with four years of depression as well as four seasons of exhausting labor under the ice, we were completely financially and mentally exhausted without having found what we were after. We suspended operations, but I was far from the point of giving up the thing as a bad job.

THE next three and one-half years were some of the most nerve-wracking in other ways. I didn't have the finances to go ahead and I didn't want to lose the property. I felt that eventually, somehow, some way, I'd find the means of locating that rich paystreak.

Even though I'd have to quit much other needed work to accomplish it, I'd go up to the glacier each summer and do the required hundred dollars worth of assessment work. That is, I'd thought it would be required, as usual, but the exasperating thing about it was that just before the year expired and I'd done the work, Congress would declare a moratorium on assessment work and I'd find out that it was unnecessary for me to have gone to all that trouble to hold the ground.

Well, in 1936 I found the funds to make one last try. I felt certain that I'd locate the vein this time and, with the assistance of another miner, I went ahead. Then, on March 30, this year, we found the stuff we'd been looking for. I chipped off seventy pounds from the vein and brought it to Ketchikan and had the ore amalgamated. The sponge was sent to the Government assay office at Seattle, and the report proved its richness.

I've got the location marked by triangulation from several points on the solid rock beside the glacier and I'm getting ready to go in with another outfit for further development. In all, we drove six thousand feet of tunnel in the ice to find the high-grade.

Of course, I don't know how much of the rich stuff there is there, but the vein is three and one-half feet wide and, even if there's only a few thousand pounds, it will be worth while. Then, I suppose they'll be calling me a "lucky fool."